



# Interoperability Services Guide

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**TRUVEN**<sup>≡</sup>  
HEALTH ANALYTICS

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## Introduction

### Objective

This document provides a technical overview of the **Alabama One Health Record®** (also referred to as “the Alabama Exchange” in this document) and the standards-based specifications regarding connectivity to the Alabama Exchange.

First, this guide will serve as an introduction to the technical services, implementation methodology and national standards that have been employed to develop the Alabama One Health Record® into a highly secure and standards-based platform that will serve as the backbone for health information exchange in the state of Alabama. Second, this guide will detail the national standards and technical requirements that must be implemented by Exchange Participants. This guide also outlines the step-by-step connectivity process that will enable your organization to connect to the Alabama Exchange in detail.

### Intended Audience

This document is intended for prospective Alabama One Health Record® Participants seeking an introduction to the technical services provided by the Alabama Exchange and an outline of the work process required to participate in it. It is intended for technical users familiar with healthcare information technology standards such as those promulgated by IHE (Integrating the Healthcare Enterprise), HITSP (Healthcare Information Technology Standards Panel), and the ONC (Office of the National Coordinator).

### Background

The mission of the Alabama One Health Record® is to improve healthcare quality and efficiency of healthcare delivery in the state. The vision for the Alabama One Health Record® is to strengthen Alabama’s healthcare system through the timely, secure and authorized exchange of patient health information among healthcare providers that results in multiple views as well as one longitudinal patient record. The exchange of health information through the Alabama One Health Record® will support patient-centered healthcare and continuous improvements in access, quality, outcomes and efficiency of care.

The Alabama Exchange provides core HIE (Health Information Exchange) network services such as a statewide MPI (Master Patient Index), a statewide RLS (Record Locator Service), authentication services, and audit services that providers, healthcare organizations, and regional health information exchanges across Alabama could use. **Figures 1 and 2** illustrate the goals and the vision of the Alabama One Health Record®. It aims to promote access to critical health information to providers at the point of care by providing standards-based interoperability services at the intra- as well as inter-state level.

## THE ULTIMATE GOAL: QUALITY ... REQUIRES INTEROPERABLE DATA



Figure 1 – Drivers behind the Alabama Health Information Exchange

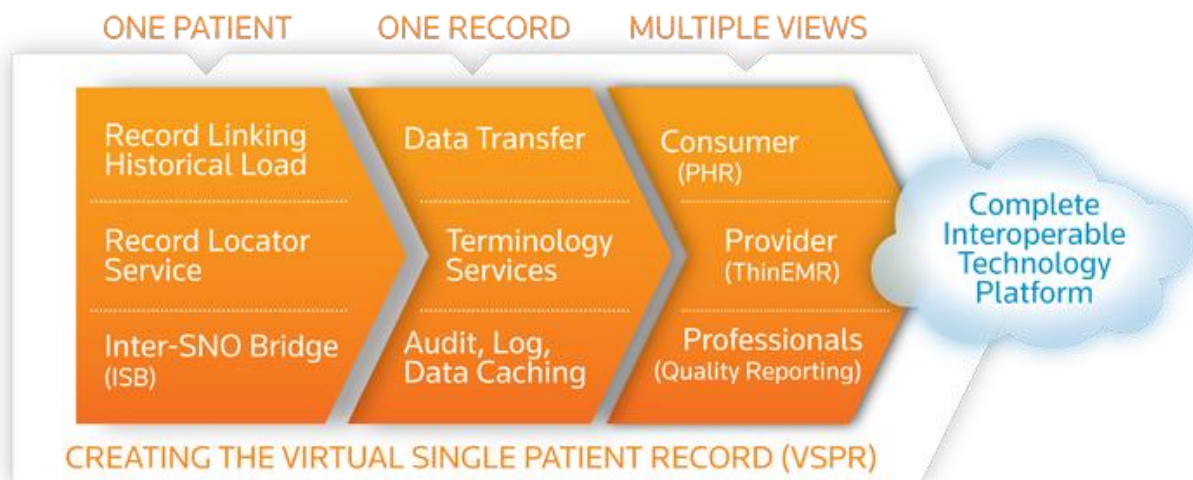


Figure 2 - One Health Record® Overview

## Guiding Principles

The Alabama One Health Record® is:

- **built on open technology standards for health information exchange and interoperability.** It does not require Participants to choose from a subset of healthcare vendors. The Alabama Exchange is based on open Healthcare IT industry standards. This allows Alabama organizations that wish to participate in the Alabama One Health Record® to choose any healthcare vendor or software that can provide support for the standards that the Alabama Exchange is based on.
- **highly secure and committed to patient privacy.** Every aspect of the health information exchange process is secured in order to protect private patient health information. Participants are required to implement a PKI certificate-based encryption scheme that protects sensitive information in transport and authenticates the Alabama Exchange Participants. All centrally located demographic information is secured using an industry leading crypto-hash persistence mechanism that guarantees sensitive demographic information cannot be revealed through the network.
- **designed on a federated information architecture.** It minimizes the amount of information that will be managed centrally. Clinical data is stored in Participant managed repositories and will be available to other Alabama One Health Record® Participants only when a verifiable clinical relationship has been established with the relevant patient.
- **focused on delivering highly valuable health data to providers.** It has implemented interfaces to a wide array of state-level health data assets, such as Medicaid claims information, so that new Participants will immediately have access to Exchange-provided clinical data for a large set of their patients – avoiding the “Empty HIE” problem. The Alabama One Health Record® provides a “Clinical Viewer” web application. It is specifically designed to provide visualization and data monitoring tools that are tailored to the wealth of data available to the Exchange in order to drive provider productivity and improved patient care outcomes.

## One Health Record® Standards Overview

### A Foundation Based on Standards

One Health Record® is built using open technology standards that fully comply with the specifications established by the Integrating the Healthcare Enterprise (IHE), the eHealth Exchange (formerly known as the Nationwide Health Information Network, or NwHIN) and the Healthcare Information Technology Standards Panel (HITSP).

#### IHE

IHE is an initiative by healthcare professionals and industry to improve the way computer systems in healthcare share information. IHE promotes the coordinated use of established standards such as DICOM and HL7 to address specific clinical need in support of optimal patient care. Systems developed in accordance with IHE communicate with one another better, are easier to implement, and enable care providers to use information more effectively.

eHealth Exchange is a set of standards, services, and policies that enable secure health information exchange over the Internet. eHealth Exchange will provide a foundation for the exchange of health IT across diverse entities, within communities, and across the country.

#### HITSP

HITSP is a cooperative partnership between the public and private sectors. The Panel was formed for the purpose of harmonizing and integrating standards that will meet clinical and business needs for sharing information among organizations and systems.

More information on all of the above standards is available in the “[A Brief Overview of eHealth Exchange Standards and IHE](#)” section below.

## Technology Overview

One Health Record® is built on a commercial off-the-shelf software (COTS) technology stack that uses a hybrid, service-oriented architecture (SOA) to deliver a standards-compliant enterprise service infrastructure to deploy and operate a statewide HIE.

Key items of note in this architecture are its flexibility and compliance with eHealth Exchange and ARRA/HITECH Meaningful Use Final Rule standards:

- One Health Record® is designed as a hybrid model where patient clinical records can be stored in repositories that are physically located adjacent to the source or could be stored in a One Health Record® hosted repository that's offered as an option to Participants.
- One Health Record® provides a statewide Master Patient Index (MPI) service.
- One Health Record® also implements a Record Locator Service (RLS), which serve as a “white pages” for the state providing pointers to clinical information about a given patient.
- One Health Record® provides the Service Access Layer, which provides a trusted uniform transport and security infrastructure based on web services following IHE standards. These standards (i.e. IHE ATNA) describe the security environment (user identification, authentication, authorization, and access control), audit requirements, and transport-level security (TLS) requirements to ensure each network node complies with the guiding principles of One Health Record® for security and privacy.

Figure 3 shows One Health Record® Services and the interoperability standards used by healthcare providers to connect to the exchange. It demonstrates compliance with national interoperability standards, which facilitates connection to eHealth Exchange and to other states' exchanges. Similarly, the HITSP and IHE standards for content that are based on the Clinical Document Architecture (CDA), the IHE standards for connectivity like Patient Identifier Cross Reference (PIX), Cross Enterprise Document Sharing (XDS.b), and Audit Trail and Node Authentication (ATNA) allow providers from disparate and diverse healthcare settings within the state to connect to One Health Record® and effectively and securely exchange patient information. The flexibility of the One Health Record® is demonstrated by the fact that the same connectivity principles are applied and the same onboarding process is used, irrespective of the type of organization that is connecting (e.g. a clinic, a regional health information exchange with existing MPI, or a large IDN).

## HIE ADVANTAGE - STANDARDS BASED EXCHANGE

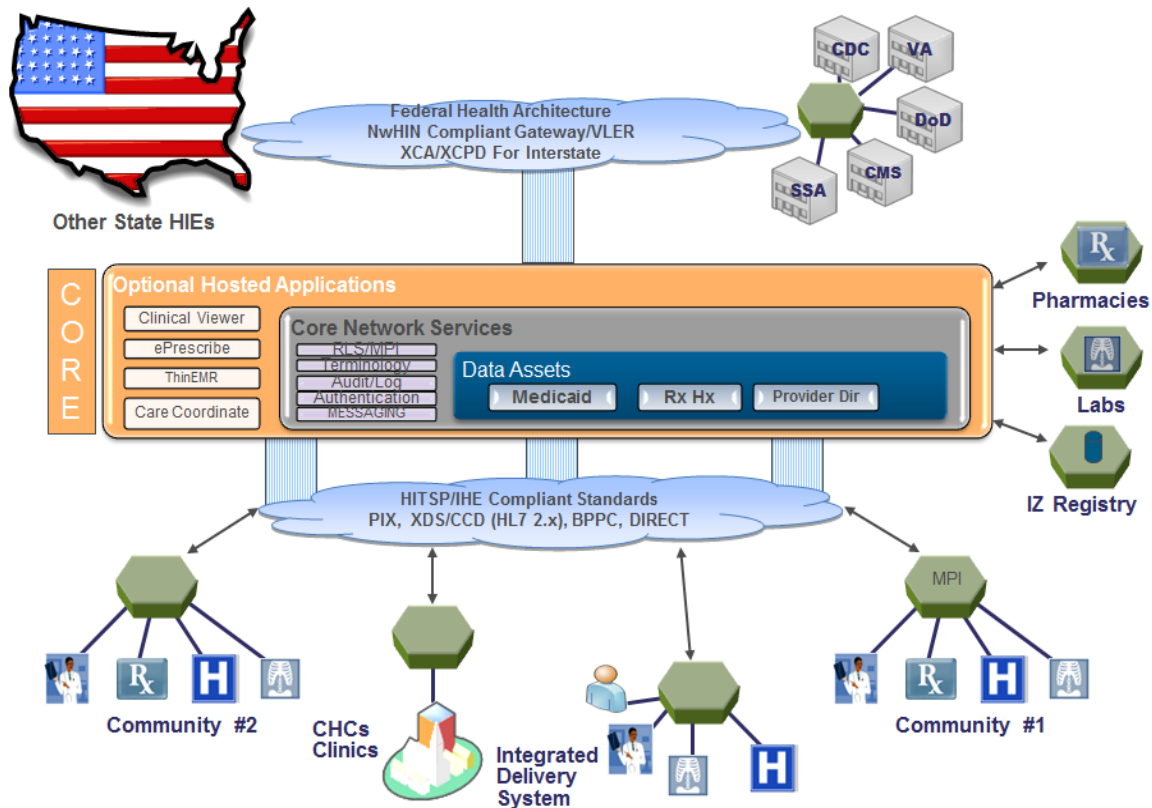


Figure 3: One Health Record® Services and Standards-based Interoperability

Figure 3 illustrates the high-level architecture of the One Health Record®. There are core services, data assets and other applications that are available to Participants in the Exchange. The HITSP/IHE-promoted standards apply to intrastate Participants of any kind where PIX, XDS.b, or CDA/CCD play a major role. Participants in the One Health Record® can leverage the connectivity to Public Health as shown on the right. Bi-directional flow with the Immunization Registry and Electronic Submission of Labs to Public Health are some of the services that can be available based on the level of participation in the Exchange.

The segment of Figure 3 that points to the federal entities like Department of Defense, Veteran's Administration, etc. and to the other states shows the ability of One Health Record® to participate in inter-state exchange through the use of standards. A Cross-Community Patient Discovery (XCPD) gateway that allows for patient discovery and a Cross-Community Access (XCA) gateway that manages exchange of patient clinical information with other states or federal entities will be available to be leveraged by those Participants that wish to participate at an inter-state level.

## Brief Overview of eHealth Exchange Standards and IHE

### Standards for Connectivity

It is required of all One Health Record® Participants to have a basic understanding of the standards, services and policies (some mandated and some indirectly driven by the eHealth Exchange) that form the basis for the technical requirements specified in this document. An introduction to the core standards and specifications is provided in this section. Detailed documents describing these standards and specifications are available here:

#### Integrating the Healthcare Enterprise: Technical Framework

Of specific relevance to One Health Record® are the IHE *IT-Infrastructure (ITI)* and *Patient Care Coordination (PCC)* profiles that are described here:

- [http://www.ihe.net/Technical\\_Framework/](http://www.ihe.net/Technical_Framework/)

#### eHealth Exchange History and Background

The eHealth Exchange evolved from the NwHIN Exchange in October 2012, and is administered by HealtheWay, a non-profit public/private partnership. More information the organization and their standards for exchange can be found on their website:

- <http://www.healthewayinc.org/index.php/about/vision-and-mission>

#### NwHIN History and Background

Although NwHIN Exchange has now transitioned to eHealth Exchange, the specifications prescribed are still relevant to the One Health Record®. The One Health Record® has implemented the specifications prescribed by NwHIN and provides the necessary Gateway Services to be a node on NwHIN Exchange. Background on NwHIN can be found here:

- <http://www.healthit.gov/policy-researchers-implementers/nwhin-history-background>

#### HITSP Harmonization Framework

- <http://www.hitsp.org/harmonization.aspx>
- <http://www.hitsp.org/default.aspx#c>

### Integrating the Healthcare Enterprise (IHE)

IHE is an industry-leading initiative that seeks to facilitate the exchange of information among healthcare systems by creating detailed specifications for specific use cases that optimize established standards.

IHE has published a set of “Integration Profiles” (an amalgamation of existing standards and supplemental usage constraints designed for a specific use case) that define the core interoperability services implemented by One Health Record®. Specifically, the following integration profiles must be understood and implemented by Participants:

1. **PIX:** Patient Identifier Cross Reference
  - PIX does matching based on demographics to map patient identifiers from across independent sources for the same patient
2. **XDS.b:** Cross Enterprise Document Sharing
  - XDS.b refers to two major components: an XDS.b Document Registry and an XDS.b Document Repository
  - XDS.b Registry is like a card catalog in a library and maintains metadata about each document that is made known to the registry. It does not store the actual document but contains a link to the actual document in the repository in which it is stored
  - XDS.b Repository is analogous to the stacks in a library where the books are actually stored. The XDS.b Repository is where the actual clinical documents are stored. The One Health Record® supports a hybrid model of document repositories. The repository is responsible for registering its documents with the XDS.b Registry
3. **ATNA:** Audit Trail and Node Authentication
  - ATNA is the IHE profile that supports the authentication of various Participants in a network and defines rules to ensure that communication is secure
4. **CT:** Consistent Time
  - CT provides consistent definition of date/time enabling time synchronization across multiple systems
5. **BPPC:** Basic Patient Privacy and Consent
  - BPPC provides a mechanism to record patient opt preferences
6. Subset of Content Profiles like the HITSP C32, XPHR, MS, IC, etc.

IHE also tests and verifies compliance with these integration profiles at carefully planned and supervised events called “Connect-a-thons”. The One Health Record® core network service technologies have been verified for compliance with regards to the relevant integration profiles. Participants can inquire whether vendors supplying interoperability services to their organizations have also been at a recent Connect-a-thon in order to assess the vendor capabilities.

## Content Standards

While the majority of this document focuses on the transport, handshake, and mechanism of exchange, the actual “content” of what health information may be exchanged from a technology standpoint is governed by the following industry standards:

### Clinical Document Architecture

**Clinical Document Architecture (CDA)** is an HL7 document markup standard that specifies the structure and semantics of "clinical documents" for the purpose of exchange. CDA documents derive their machine-processable meaning from the HL7 Reference Information Model (RIM) and use the HL7 Version 3 Data Types. CDA is flexible XML-based clinical document architecture. CDA itself is not a specific document, but can be used to express many types of documents.

A CDA document can contain many data sections, all of which contain narrative text. Some CDA sections contain structured data elements, and some of those data elements are coded. There are many types of CDA documents, including CCD, XPHR, HITSP C32, MS Discharge Summary (HITSP C48), History and Physical (HITSP C84), Lab Report (HITSP C37), etc. Some of the more common ones are described below.

### Continuity of Care Document

**Continuity of Care Document (CCD)** describes constraints on the HL7 Clinical Document Architecture, Release 2 (CDA) specification. It specifies a core data set of the most relevant administrative, demographic, and clinical information facts about a patient’s healthcare, covering one or more healthcare encounters. It provides a means for one healthcare practitioner, system, or setting to aggregate all of the pertinent data about a patient and forward it to another practitioner, system, or setting to support the continuity of care.

CCD is just one type of CDA document. Other types of CDA documents can contain some of the same CCD sections, but different sections as well.

### HITSP C32

The HITSP Summary Document using the HL7 Continuity of Care Document (CCD) Component, HITSP C32, describes the document content summarizing a patient’s medical status for the purpose of information exchange. HITSP C32 is based on a CCD but further constrains the CCD specification.

The content may include administrative (e.g., registration, demographics, insurance, etc.) and clinical (e.g., problem list, medication list, allergies, test results, etc.) information. Any specific use of this component by another HITSP specification may constrain the content further based upon the requirements and context of the document exchange. This specification defines content in order to promote interoperability between participating systems. Any given system creating or consuming the document may contain much more information than conveyed by this specification. Such systems may include Personal Health Records (PHRs), EHRs (Electronic Health Records), Practice Management Applications, and other persons and systems as identified and permitted.

### HITSP CDA Content Modules (C83)

**HITSP CDA Content Modules (C83)** specification is a library of the HITSP-defined data elements utilized for mapping to data elements from selected standards on which HITSP is based. It is used by other HITSP components to establish the set of harmonized constraints that HITSP applies across the selected standards.

Note that the HISTP C32 has a dependency on the HISTP C83 as far as the constraints on each content module's data elements.

### IHE Patient Care Coordination Profiles

**IHE PCC** domain was established in July 2005 to deal with integration issues that cross providers, patient problems or time. It deals with general clinical care aspects such as document exchange, order processing, and coordination with other specialty domains. PCC also addresses workflows that are common to multiple specialty areas and the integration needs of specialty areas that do not have a separate domain within IHE.

IHE Patient Care Coordination (PCC) does not refer to a single CDA based document but a series of various medical summary document types. Some of the more common IHE PCC Profiles include document types like Medical Summary (MS), Emergency Department Referral (EDR), Exchange of Personal Health Record Content (XPHR), and Immunization Content (IC). These form some of the initial set of documents accepted by the One Health Record® registry.

### Consolidated CDA or CCDA

From HL7: "The Consolidated Templated implementation guide contains a library of CDA templates, incorporating and harmonizing previous efforts from Health Level Seven (HL7), Integrating the Healthcare Enterprise (IHE), and Health Information Technology Standards Panel (HITSP). It represents harmonization of the HL7 Health Story guides, HITSP C32, related components of IHE Patient Care Coordination (IHE PCC), and Continuity of Care (CCD), and it includes all required CDA templates in Final Rules for Stage 1 Meaningful Use and 45 CFR Part 170 – Health Information Technology: Initial Set of Standards, Implementation Specifications, and Certification Criteria for Electronic Health Record Technology; Final Rule.<sup>1</sup>"

### What it means to “Connect to the One Health Record®”

Connecting to the One Health Record® means that Participants will be able to send and receive health information amongst other One Health Record® Participants that have been connected to the One Health Record® by leveraging the MPI, RLS, and core network services offered by the One Health Record®.

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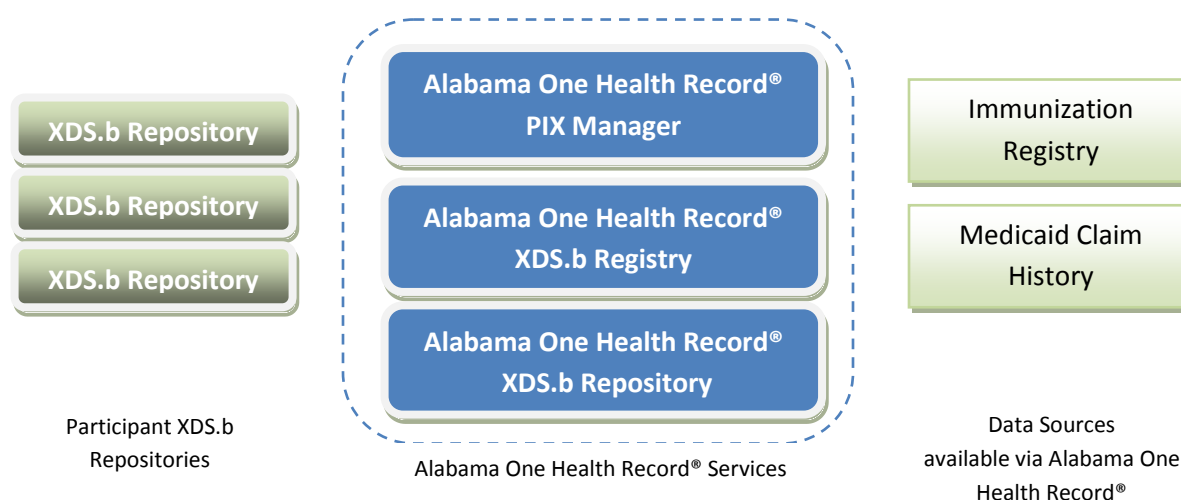
<sup>1</sup> HL7 Implementation Guide for CDA® Release 2: IHE Health Story Consolidation, Release 1.1 - US Realm. July 2012.

Participants must agree to abide by all policies and procedures that govern the operation of One Health Record® (see <http://www.onehealthrecord.alabama.gov> for detailed policy documents).

In order to connect to the One Health Record®, Participants' health information systems will need to implement the technical services and interfaces described in the "Step-by-Step Overview of One Health Record® Data Flow" section below. In addition, Participants will need to follow the process steps outlined in "Getting Connected- Process Flow" in order to demonstrate standards-based exchange capabilities and obtain production credentials and connectivity information.

### **Resources Provided by the One Health Record® to Participants**

The One Health Record® implements a set of IHE profiles and eHealth Exchange standards compliant services to facilitate the flow of clinical data between Participants. These network-level services are intended to support the management of clinical data by providing secure patient identity management and record location for all patients in the state of Alabama.



## One Health Record® PIX Management Service

The One Health Record® PIX Management service provides identity management services to One Health Record® Participants. Participants will send demographic information for the patients they manage to the One Health Record® PIX Manager which implements a record-linking algorithm to link together patient records across the state.

The One Health Record® PIX Management Service implements the PIX (Patient Identifier Cross-Referencing) IHE integration profile.

## One Health Record® XDS.b Document Registry

The One Health Record® provides a statewide XDS.b Document Registry that provides record location services (RLS) for all clinical data available through the One Health Record®. Participants will register metadata describing the clinical documents they are making available through their XDS.b Repositories so other Participants can easily obtain a catalog of all clinical data and its managing repository for a particular patient.

The One Health Record® Document Registry implements the XDS.b (Cross Enterprise Document Sharing-b) IHE integration profile.

As part of the One Health Record® connectivity testing, Participants will be provided guidance on certain required metadata values such as the correct PIX namespace, Repository ID (to avoid conflicts across Participants), Source ID root object identifier (OID)<sup>2</sup>, and Document ID root OID. The required OIDs will be based on the One Health Record® Root OID, 1.3.6.1.4.1.38694 and each Participant will be provided child OIDs for their organization by the One Health Record® when the on boarding process is initiated.

<sup>2</sup> Many standards define certain objects for which unambiguous identification is required. This is achieved by registration. Registration is the assignment of an object identifier (OID) to an object in a way which makes the assignment available to interested parties. Different types of “objects” can be identified by an OID, including but not limited to a country, a company, a project, and ISO standards. OIDs are in use widely in the HL7 standard to specify concepts like identifier namespaces, terminology identification, value sets, conformance profiles, v3 templates.

Each Participant must ensure that each facility within their organization that is connecting to the One Health Record® is assigned a different source ID based on the Source ID root OID that is provided. Similarly, the document IDs being submitted by each Participant should be based on the Document ID root OID.

### One Health Record® XDS.b Document Repository

As part of the One Health Record® interoperability, Participants are required to implement XDS.b repository functionality. Participants can choose to use XDS.b repository functionality that might already be available to them through some internal system, implement their own, or delegate this responsibility to the One Health Record®.

The One Health Record® provides an optional XDS.b Document Repository to Participants who prefer a hosted XDS.b repository. If Participants choose to use this option, the One Health Record® XDS.b Repository will host the clinical documents on the Participants' behalf. Participants will have to provide the clinical documents to the One Health Record® repository along with some metadata information. The repository then registers the document with the One Health Record® XDS.b Document Registry and handles subsequent requests for document retrieval.

NOTE: this option can only be used if Participants are publishing a stable clinical document. If a Participant chooses to only publish on-demand documents that are created at the time of document request, the registration as well as retrieval requests for those documents is expected to be handled directly by the end Participant.

### Audit and Logging Services

The One Health Record® captures audit data for identity management and its core clinical data services. The One Health Record® does not provide a centralized store of audit information for clinical data that is managed in locally implemented XDS.b repositories unless Participants route their requests for clinical documents to other Participant repositories via the One Health Record® gateway. Participants who are managing locally implemented repositories are required to also implement appropriate audit services, as described by the IHE ATNA Secure Node Integration Profile.

## A Step-by-Step Overview of One Health Record® Data Flow

The following section describes the basic data flow in the One Health Record® and applies to all Participants.

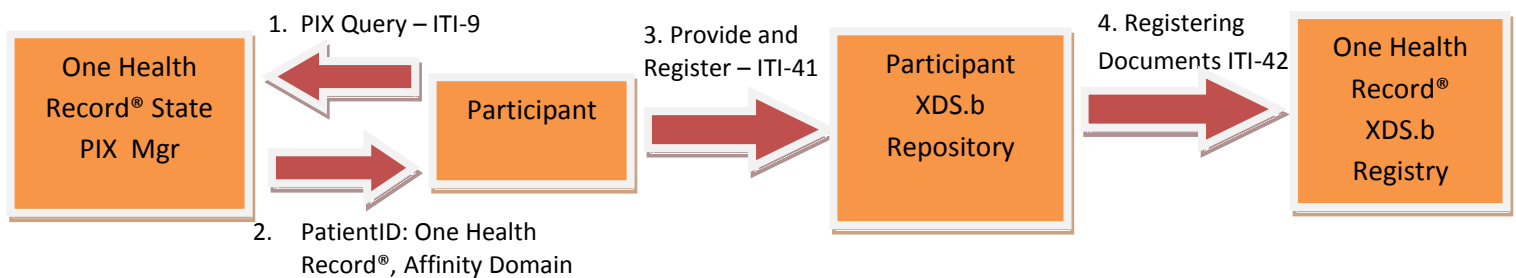
Patient demographic information and clinical data flow through One Health Record® and utilize its standards-compliant services in the following manner:

### Step 1 – Provide Patient Information



The Participant (the Patient Identity Source) sends a Patient Identify Feed (ITI-8) transaction to add/update a patient in the domain specified in the transaction. The One Health Record® PIX Manager then handles the cross-referencing of patients across multiple domains and ensures that any documents in the Registry will be associated with this patient. Patient information must be provided to and processed by the One Health Record® PIX Manager before documents can be submitted or retrieved for that patient.

### Step 2 – Provide Documents

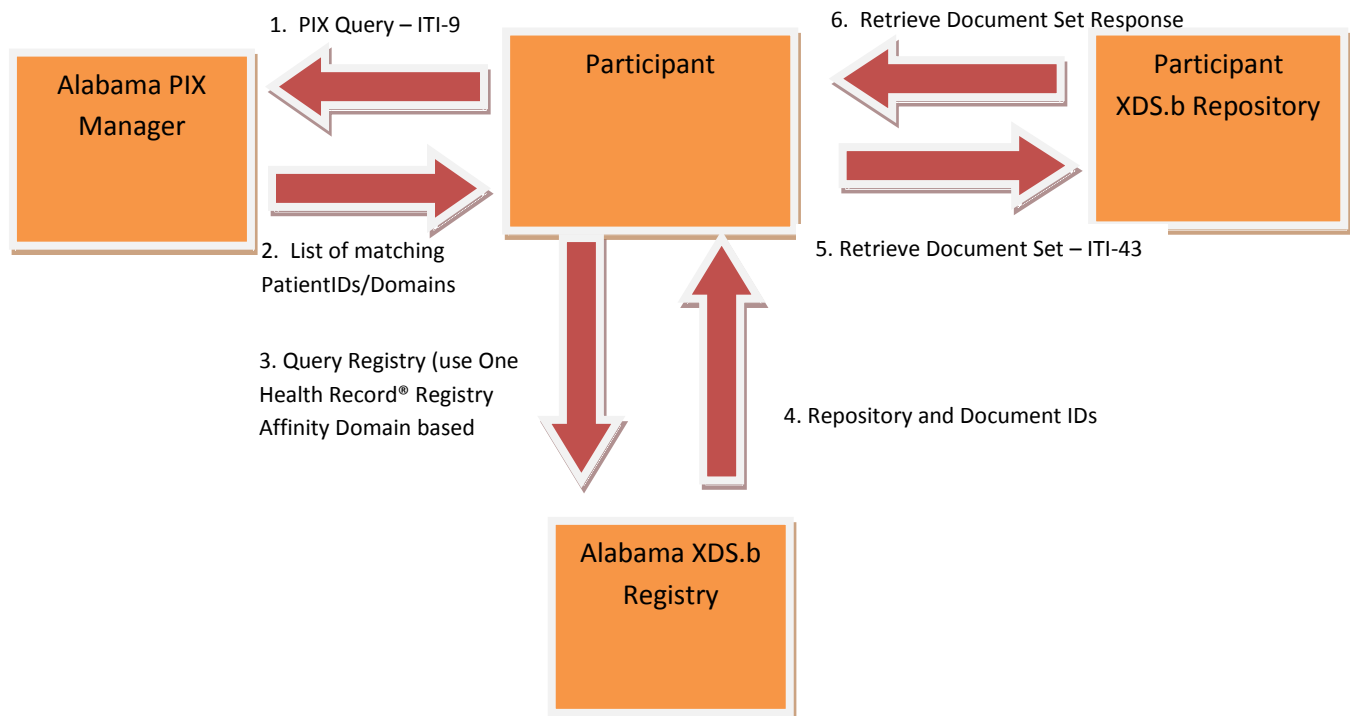


Now that a patient is in the system, the Participant can begin adding documents associated with that patient. The Participant (the Document Source) will send a Provide and Register Document Set-b (ITI-41) transaction to an XDS.b repository. If the XDS.b repository in this flow is the One Health Record® XDS.b repository, then the Register Document transaction (ITI-42) is handled by this XDS.b repository and there is no further action required by the Participant.

The results of this transaction are:

- The document(s) in the transaction are then stored in an XDS.b Repository and available for retrieval
- The provided documents are registered with the One Health Record® XDS.b Registry

## Step 3 – Retrieve Documents



After patient information is provided to the One Health Record® PIX Manager and there are documents associated with the patient, the general flow required to retrieve available documents for a patient is as follows:

- Participant sends a PIX Query (ITI-9) transaction. The One Health Record® PIX Manager responds with a list of cross-referenced matching PatientIDs/domains. The PatientID associated with the “One Health Record®” Registry Affinity Domain should be the ID used for registry transactions
- Participant queries the One Health Record® XDS.b Registry via a Registry Stored Query (ITI-18) transaction using the cross-referenced One Health Record® Registry Affinity Domain based identifier that was received from the PIX Manager. The One Health Record® XDS.b Registry returns a response containing document information.
- Using the information contained in the response, Participant queries the appropriate repositories using the Retrieve Document Set (ITI-43) transaction. The queried repositories return a document set.

The result of these transactions will be a clinical document set that may contain demographics, problems, procedures, medications, allergies, etc. (depending on the information available on the patient in question). This document set will contain the clinical information from other One Health Record® Participants about the patient in question.

## One Health Record® IHE Participation: Architecture

### One Health Record® Connectivity - Levels of Participation:

Each Participant has to decide what their goals are for connecting to the One Health Record®. It is required that every Participant satisfies the requirements of the 1<sup>st</sup> Level: “Basic Connectivity” in order to participate in the One Health Record®. Based on their own specific goals, Participants can additionally choose to participate in one or more of the other levels. The requirements for connectivity for each level are different.

The 1<sup>st</sup> level and its requirements must be satisfied by all Participants in order to participate in the Exchange. The other levels have no dependencies and Participants can choose to participate in one or more of the levels 2, 3, 4, 5, and 6 if they are able to fulfill the requirements of the 1<sup>st</sup> Level plus the additional requirements of the specific level(s) of interest to them.

#### Connectivity Levels:

- **1<sup>st</sup> Level: Basic Connectivity** (required of ALL participants): This level allows Participants to register documents of various formats with the One Health Record® and query the One Health Record® for information on a patient.
- **2<sup>nd</sup> Level: CDA Content Certified** (highly recommended): This level requires Participants to register only CDA based documents with the One Health Record®. This is the level that most Participants should choose. Meaningful Use eHealth Exchange efforts are already driving HITSP content standards based on the CDA. An organization pursuing Meaningful Use should not have difficulty participating at this level.
- **3<sup>rd</sup> Level: BPPC/Record Patient Consent Workflow Certified**: This level enables Participants to communicate Patient Opt status electronically to the One Health Record®. If not implementing this level, Participants may manage the Patient Opt status manually via a web portal (which requires administrative resources and is not as efficient).
- **4<sup>th</sup> Level: Immunization Reporting Workflow Certified**: Participating at this level enables Participants to send Immunization administration messages to the Immunization Registry as well as query the Immunization Registry for Immunization History on a patient. Complying with this level also helps satisfy the Meaningful Use criterion for electronic submission of data to Immunization Registry. This means that Participants do not have to perform duplicate data entry into a separate system. The One Health Record® takes care of the end connectivity to the Immunization Registry.
- **5<sup>th</sup> Level: Public Health Lab Reporting Workflow Certified**: This level allows a Participant to automatically send lab results to Public Health. This level helps satisfy the Meaningful Use criterion for electronic submission of lab results to Public Health. The One Health Record® takes care of the end connectivity to Public Health.
- **6<sup>th</sup> Level: eHealth Exchange/VLER Workflow Certified**: By participating in this level, each Participant does not independently have to go through the eHealth Exchange onboarding process but will leverage One Health Record®’s participation in eHealth Exchange. (The eHealth

Exchange onboarding is a planned activity for the One Health Record®.) This level allows Participants to exchange information with other eHealth Exchange nodes.

- **7<sup>th</sup> Level: Syndromic Surveillance/BioSense 2.0 Workflow Certified:** This level allows Participants to automatically send Syndromic Surveillance data to BioSense 2.0, AL's designated Syndromic Surveillance system.

## Content Validation and Testing Process

One Health Record® requires that Participants have successfully completed the content testing process for each connectivity level to ensure that compliant CCD/C32 and other document content profiles can be created by the sending system. Please refer to the “HIE Interoperability Services Testing Guide” for more information on content validation and testing.

## 1<sup>st</sup> Level – “Basic Connectivity” Overview: Connecting to One Health Record®

Participants connect to the Exchange using IHE standards. Participants will utilize the One Health Record® PIX Manager Service and XDS.b Registry Service for Master Patient Index and Record Location functionality. The actual clinical content and its storage are the responsibility of each Participant.

- Participants will register the document with the One Health Record® XDS.b Registry. As part of One Health Record® participation, Participants are also required to have XDS.b repository capabilities. For XDS.b repository functionality, Participants can choose to implement their own (e.g., their native EMR or some other internal standards-based interoperability engine) or they can use the XDS.b repository offered by the One Health Record®. Participants’ chosen XDS.b repository is responsible for responding to document retrieval requests from other Participants in the Exchange for documents registered by that specific repository.

## Minimum required transactions to be implemented by Participants

Integration Profile	Description of Required Functionality
ITI-8: Patient Identity Feed (as Patient Identity Source)	Participants will send patient demographics to the One Health Record® PIX Management Service.
ITI-9: PIX Query (as Consumer)	Participants will query the One Health Record® PIX Manager to receive a record location list.
ITI-18: Query Registry (as Consumer )	Participants must query the One Health Record® XDS.b Registry for data from other One Health Record® Participants. Note that it is required that Participant be able to query for both “stable” as well as “on-demand” documents, since either could be registered by any given document source/repository.
ITI-41: Provide and Register Document Set-b (as Source)	This is required of Participants choosing to leverage the One Health Record® XDS.b Repository. Participants must populate the One Health Record® XDS.b Repository with clinical data for its patients.
ITI-42: Register Document Set-b (as Repository or Integrated Document Source/Repository)	This is required of Participants choosing to implement their own XDS.b repository. In this case, sending the “Provide and Register” transaction to the right repository is the responsibility of each Participant and that repository must send a Register Document Set-b

	<p>transaction to the One Health Record® XDS.b Registry</p> <p>Participants must populate the One Health Record® XDS.b Registry with meta data for its patients' clinical documents.</p>
ITI-43: Retrieve Document Set (Repository or Integrated Document Source/Repository)	<p>This is required of participants choosing to implement their own XDS.b Repository.</p> <p>Participants must respond to queries to its XDS.b repository from other One Health Record® Participants.</p>
ITI-43: Retrieve Document Set (as Consumer)	<p>Participants must be capable of issuing a Retrieve Document Set transaction in order to retrieve clinical documents from other participant repositories</p>

## Data Flow Summary by Exchange Function in the 1<sup>st</sup> Level:

Exchange Function	Data Flow Summary
Record Location	<ol style="list-style-type: none"> <li>1. Local PIX Consumer sends patient demographic information to the One Health Record® PIX Manager.</li> <li>2. The PIX Manager responds with record location information (patient and domain identifiers) for matching patient records available in the One Health Record®.</li> </ol>
Sending Clinical Data	<ol style="list-style-type: none"> <li>3. Participants send clinical data to its XDS.b repository, which must in turn register the documents with the One Health Record® Registry.</li> <li>4. XDS.b Consumers (other participants) on the One Health Record® will query the One Health Record® XDS.b Registry.</li> <li>5. Participants will then query the XDS.b repository for clinical documents.</li> </ol>
Receiving Clinical Data	<ol style="list-style-type: none"> <li>6. Participants' XDS.b Consumer service queries the One Health Record® Registry for available clinical documents.</li> <li>7. Participants will then query the XDS.b repository for clinical documents.</li> </ol>

## 2<sup>nd</sup> Level: CDA Content Certified—RECOMMENDED

Participants at this level create and publish CDA compliant documents to the Exchange. It is highly recommended that all Participants choose this level, as this will create a common language for clinical information communication within the One Health Record®.

### One Health Record® IHE Participation: Sending Compliant Content

The One Health Record® supports a number of industry standard content formats that can be registered in the One Health Record® XDS.b Document Registry. All acceptable document formats are specific implementations of the CDA specification. Document standard content formats that will pass validation and can be registered with the One Health Record® include but are not limited to:

1. Consolidated CDA (CCDA) Documents
2. HISTP/C32 v2.x Summary Documents
3. IHE XDS-MS Referral Summary (HITSP/C48)- 2009 (or later)
4. IHE XDS-MS Discharge Summary (HITSP/C48)- 2009 (or later)
5. IHE EDR Emergency Department Referral (HITSP/C84)- 2009 (or later)
6. IHE XPHR Personal Health Record Abstract- 2009 (or later)
7. IHE IC Immunization Content- 2009 (or later)
8. IHE BPPC Basic Patient Privacy Consents- 2009 (or later)
9. IHE XDS-SD Cross Enterprise Sharing of Scanned Documents – 2009 (or later)
10. IHE Laboratory Report- 2008 (or later)
11. IHE Laboratory Report (HITSP/C37)- 2007 (or later)

Additional formats not shown on the above list may be validated and accepted by the One Health Record®. Please contact a One Health Record® technical resource by emailing [ALHIESurvey@onehealthrecord.alabama.gov](mailto:ALHIESurvey@onehealthrecord.alabama.gov) if additional content specifications are needed. Please indicate what supporting use cases are involved.

### **3<sup>rd</sup> Level – “BPPC/Record Patient Consent” Workflow**

A Participant choosing this level must implement the IHE Basic Patient Privacy Consent (BPPC) profile. The IHE BPPC profile is used to record and communicate patient “opt out” and “cancel opt out” preferences. These preferences are global, triggering a system wide implementation of the patient’s desired status. Participants can choose to produce the BPPC document with or without a scanned document part.

The BPPC document registered must be registered as a stable document.

### **4<sup>th</sup> Level: Immunization Reporting Workflow**

The One Health Record® is working with the Alabama Department of Public Health (ADPH) to understand the Immunization Registry reporting options and establish a connection from One Health Record® to ADPH to report immunizations electronically. The One Health Record® is also working to define Participants’ requirements for immunization reporting such that connectivity to the One Health Record® enables flow of immunization information from a Participant to ADPH.

### **5<sup>th</sup> Level: Public Health Lab Reporting Workflow**

The One Health Record® is working with the Alabama Department of Public Health (ADPH) to understand the Electronic Lab Reporting options and establish a connection from One Health Record® to ADPH to report labs electronically. The One Health Record® is also working to define Participants’ requirements for lab reporting such that connectivity to the One Health Record® enables flow of lab information from a Participant to ADPH.

## 6<sup>th</sup> Level: eHealth Exchange/VLER Workflow

### eHealth Exchange Connectivity Enablement Overview

The 6<sup>th</sup> level is required by Participants who wish to use One Health Record® as a gateway to the eHealth Exchange through which they will be able to connect to Federal entities like the Department of Defense, the VA and to other states that are nodes on the eHealth Exchange. (See Figure 3 for One Health Record® architecture).

For a Participant to become a direct node on the eHealth Exchange and talk to other eHealth Exchange nodes, an exhaustive eHealth Exchange on-boarding process includes sponsorship from a federal agency, seeking approval for participation in the eHealth Exchange, and a comprehensive technical testing process followed by production on-boarding.

On-boarding to the One Health Record®, however, makes the eHealth Exchange connectivity process more efficient and transparent for a One Health Record® Participant. The One Health Record® will be responsible for the process of becoming a node on the eHealth Exchange and abiding by the technical and policy requirements of the eHealth Exchange. A Participant in the One Health Record® needs to indicate their interest in this level and satisfy the requirements of this level in order to have bi-directional data flow enabled with *specific* nodes on the eHealth Exchange.

Please note that the One Health Record® is not yet a node on the eHealth Exchange but will be pursuing the effort of onboarding in order to become a node. Once this process is complete, One Health Record® participants will have the ability to exchange patient information with other nodes on the eHealth Exchange, bi-directionally.

### Relevant Exchange Functionality and Services enabling this flow:

In support of inter-state communication, the One Health Record® will implement XCPD Initiating and Responding gateways and XCA Initiating and Responding gateways following the eHealth Exchange specifications. This implementation of the XCPD, XCA profiles will enable the One Health Record® to be a node on the eHealth Exchange and share patient and clinical information with other nodes on the eHealth Exchange as appropriate.

### Requirements to be implemented by Participants to leverage One Health Record® connectivity to the eHealth Exchange

Integration Profile	Description of Required Functionality
ITI-43: Retrieve Document Set (as Consumer)	Participants must be capable of issuing a Retrieve Document Set transaction <i>to the One Health Record® XCA Initiating Gateway</i> , providing it with <b>three required parameters</b> : HomeCommunityId, DocumentId, and RepositoryId. (Note that prior to this, Participants, in the role of a document consumer, should have issued a Registry Stored Query by PatientID and would have received all three parameters in the response. It is

	required that Participants have the capability of retaining and sending the HomeCommunityId, the DocumentID and the RepositoryID if they wish to retrieve the document content)
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Note that the eHealth Exchange also requires HITSP C32 as the standard for clinical content. Participants should be able to comply with this requirement in order to share information on their patients with other nodes on the eHealth Exchange.

### **7<sup>th</sup> Level: Syndromic Surveillance/BioSense 2.0 Workflow**

#### **Syndromic Surveillance/BioSense 2.0 Connectivity Enablement Overview**

The One Health Record® is working with the Alabama Department of Public Health (ADPH) and the Centers for Disease Control (CDC) to establish a connection from One Health Record® to Biosense 2.0 for electronic reporting of Syndromic Surveillance data. Any contributed data will be managed by ADPH in a secure state Biosense data locker.

## Getting Connected - Process Flow

The One Health Record® has established the following step-by-step procedure for Participants to establish and validate a standards-compliant interface to the One Health Record®.

### Step 1: Preparation and Readiness

- **Complete Readiness Assessment Survey:** As part of this step, Participants are required to complete a survey to help understand One Health Record® connectivity goals, baseline system capability to connect to the One Health Record® and to gather general information about the participating organization.
- **Review Interoperability Service Guide:** This is to help ensure an understanding of what is involved in the One Health Record® on-boarding process and to help Participants make informed decisions about level of participation.
- **Complete the On-boarding Decisions Form:** This form enables Participants to formalize decisions regarding connectivity to One Health Record®, such as whether to use the XDS.b Repository option hosted by One Health Record®. It also requires Participants to state what levels of connectivity they expect to achieve. This drives the testing requirements in the process.
- **Complete Participation Agreement Form:** This form constitutes a legal agreement between the Participant and the Alabama One Health Record®

Email [ALHIESurvey@onehealthrecord.alabama.gov](mailto:ALHIESurvey@onehealthrecord.alabama.gov) when Step 1 is complete. Return completed forms as part of the email.

### Step 2: Complete Technical Connectivity Testing & Training

- **Complete Technical Connectivity Testing:** Once you have completed Step 1, you will receive the “HIE Interoperability Services Testing Guide”, certificates and endpoints for testing. Note that the HIE Interoperability Services Testing Guide has a section for each level of participation and Participants are required to complete the requirements for all the levels that have been selected as part of the On-boarding Decisions Form. Participants are required to use only mock patient data. No PHI should be transmitted as part of the testing process.
- **Site Administrator Training:** One Health Record® and Truven Health Analytics will provide training to site administrators to include; understanding participation agreement obligations and ONE HEALTH RECORD policies, how to perform role-based access control and provisioning and understanding and utilizing appropriate support processes.
- **Patient Notice Training:** One Health Record® and Truven Health Analytics will provide training to explain HIE Patient Notice and Opt-Out Policies and how to make opt-out/opt-in updates in the exchange.

Send an email to [ALHIESurvey@onehealthrecord.alabama.gov](mailto:ALHIESurvey@onehealthrecord.alabama.gov) when Step 2 is complete.

### Step 3: Begin Patient Notice Process

- As part of connecting to One Health Record®, Participants should follow their organizational policy guidelines. If it is required to notify patients of upcoming One Health Record®, participation, this is the time to initiate patient notification process.

Email [ALHIESurvey@onehealthrecord.alabama.gov](mailto:ALHIESurvey@onehealthrecord.alabama.gov) when Step3 is complete.

### Step 4: Production Readiness

- **Receive Production Package:** This includes:
  - Technical connectivity for Production: URLs, production metadata etc.
  - Production Certificate
- **Upgrade production environment:** Participants need to ensure production environments have the required software components, configuration and certificates required to connect to the One Health Record®.
- **Test production connectivity:** Test the connectivity with the One Health Record® production environment.

Email [ALHIESurvey@onehealthrecord.alabama.gov](mailto:ALHIESurvey@onehealthrecord.alabama.gov) when Step 4 is complete.

## **Additional Resources and References**

### **PIX and XDS.b and BPPC Profiles**

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_ITI\\_TF\\_Rev8-0\\_Vol1\\_FT\\_2011-08-19.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_Rev8-0_Vol1_FT_2011-08-19.pdf)

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_ITI\\_TF\\_Rev8-0\\_Vol2a\\_FT\\_2011-08-19.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_Rev8-0_Vol2a_FT_2011-08-19.pdf)

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_ITI\\_TF\\_Rev8-0\\_Vol2b\\_FT\\_2011-08-19.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_Rev8-0_Vol2b_FT_2011-08-19.pdf)

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_ITI\\_TF\\_Rev8-0\\_Vol3\\_FT\\_2011-08-19.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_ITI_TF_Rev8-0_Vol3_FT_2011-08-19.pdf)

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_ITI\\_Suppl\\_On\\_Demand\\_Documents\\_Rev1-2\\_TI\\_2011-08-19.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_ITI_Suppl_On_Demand_Documents_Rev1-2_TI_2011-08-19.pdf) (On-demand documents)

[http://www.ihe.net/Technical\\_Framework/](http://www.ihe.net/Technical_Framework/) (Link to latest IHE Technical Profiles)

### **IHE Patient Care Coordination (PCC) Profiles or Content profiles**

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_PCC\\_TF\\_Rev7-0\\_Vol\\_1\\_2011-09-09.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_PCC_TF_Rev7-0_Vol_1_2011-09-09.pdf)

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_PCC\\_TF\\_Rev7-0\\_Vol\\_2\\_2011-09-09.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_PCC_TF_Rev7-0_Vol_2_2011-09-09.pdf)

[http://www.ihe.net/Technical\\_Framework/upload/IHE\\_PCC\\_Suppl\\_Immunization\\_Content\\_Rev2-2\\_TI\\_2011-09-09.pdf](http://www.ihe.net/Technical_Framework/upload/IHE_PCC_Suppl_Immunization_Content_Rev2-2_TI_2011-09-09.pdf)

### **HITSP C32**

[http://www.hitsp.org/ConstructSet\\_Details.aspx?&PrefixAlpha=4&PrefixNumeric=32](http://www.hitsp.org/ConstructSet_Details.aspx?&PrefixAlpha=4&PrefixNumeric=32)

### **Wiki Pages**

[http://wiki.ihe.net/index.php?title=Patient\\_Identifier\\_Cross\\_Referencing](http://wiki.ihe.net/index.php?title=Patient_Identifier_Cross_Referencing)

[http://wiki.ihe.net/index.php?title=Cross\\_Enterprise\\_Document\\_Sharing](http://wiki.ihe.net/index.php?title=Cross_Enterprise_Document_Sharing)

### **Annotated XDS.b Examples**

[http://wiki.ihe.net/index.php?title=Annotated\\_StoredQuery\\_Transaction](http://wiki.ihe.net/index.php?title=Annotated_StoredQuery_Transaction)

[http://wiki.ihe.net/index.php?title=Annotated\\_ProvideAndRegister.b\\_Transaction](http://wiki.ihe.net/index.php?title=Annotated_ProvideAndRegister.b_Transaction)

[http://wiki.ihe.net/index.php?title=XDS.b#Example\\_Retrieve\\_Document\\_Set\\_transaction](http://wiki.ihe.net/index.php?title=XDS.b#Example_Retrieve_Document_Set_transaction)

## Glossary of Terms

Acronym	Term
ARRA	American Recovery and Reinvestment Act (of 2009)
<a href="#">ATNA</a>	Audit Trail and Node Authentication
<a href="#">BPPC</a>	Basic Patient Privacy Consents
<a href="#">CCD</a>	Continuity of Care Document
<a href="#">CDA</a>	Clinical Document Architecture
COTS	Commercial Off The Shelf
CT	Consistent Time
<a href="#">CVX</a>	Refers to “Vaccines administered”
<a href="#">C32</a>	Refers to HITSP C32
EDR	Emergency Department Referral
eHealth Exchange	National HIE successor to NwHIN (administered by HealtheWay).
EHR	Electronic Health Record
HIE	Health Information Exchange
HITECH	Health Information Technology for Economic and Clinical Health
<a href="#">HITSP</a>	Healthcare Information Technology Standards Panel
<a href="#">HL7</a>	Health Level 7
IC	Immunization Content
IDN	Integrated Delivery Network
<a href="#">IHE</a>	Integrating the Healthcare Enterprise
<a href="#">ITI</a>	IT Infrastructure (IHE Profile set)
MPI	Master Patient Index
NIST	National Institute of Standards and Technology
<a href="#">NwHIN</a>	Nationwide Health Information Network (now known as eHealth Exchange)
OID	Object Identifier
ONC	Office of National Coordinator
<a href="#">PCC</a>	Patient Care Coordination (IHE Profile set for content standards)
PHR	Personal Health Record
<a href="#">PIX</a>	Patient Identifier Cross Referencing
RIM	Reference Information Model
RLS	Record Locator Service
SOA	Service Oriented Architecture
<a href="#">TLS</a>	Transport Layer Security
URI	Uniform Resource Identifier
VLER	Virtual Lifetime Electronic Record
<a href="#">XCA</a>	Cross Community Access
<a href="#">XCPD</a>	Cross Community Patient Discovery
<a href="#">XDS.b</a>	Cross Enterprise Document Sharing
<a href="#">XDS-MS</a>	Cross Enterprise Document Sharing – Medical Summaries
<a href="#">XPHR</a>	Exchange of Personal health record
XML	Extensible Markup Language